COURSE SPECIFICATION
Elective course I
Faculty of Medicine- Mansoura University

(A) Administrative information

(1) Programme offering the course:	PhD of Basic Medical Sciences in Biochemistry
(2) Department offering the programme:	Medical Biochemistry Department
(3) Department responsible for teaching the course:	Medical Biochemistry Department
(4) Part of the programme:	2nd part
(5) Date of approval by the Department`s council	29/4/2018
(6) Date of last approval of programme specification by Faculty council	
(7) Course title:	Reproductive biochemistry
(8) Course code:	BIC 604 RB
(9) Total credit hours:	2 hours

(B) Professional information

(1) Course Aims:

Educate the students the principles of reproductive biology with a special focusing on the molecular mechanisms of ovulation, fertilization & implantation . Also to provide students with assessment techniques of sperm function & oocyte quality.

(2) Intended Learning Outcomes (ILOs):

On successful completion of the course, the candidate will be able to:

A- Knowledge and Understanding

AII-26.A	***A molecular view of ovulation*** **AII-26.A.1** Discuss dynamics of ovulation **AII-26.A.2** Explain the signaling pathway & transcriptional regulation of ovulation **AII-26.A.3** Enumerate the mediators of ovulation & discuss their roles in ovulatory process including: **AII-26.A.3.a** Progesterone **AII-26.A.3.b** Eicosanoids **AII-26.A.3.c** Angiogenic factors **AII-26.A.3.d** Epidermal growth factors (EGF) **AII-26.A.3.e** Proteases & their inhibitors **AII-26.A.3.f** Matrix metalloproteinases (MMP) **AII-26.A.3.g** Plasmin / Plasminogen activator system **AII-26.A.3.h** ADAMTS (A Disintegrin-like And Metalloprotease with Thrombospondin) enzymes **AII-26.A.3. i** Immune cells **AII-26.A.3.j** Cytokines & Chemokines
AII-26.B	***Explain the molecular mechanisms involved in human fertilization.*** **AII-26.B.1** Discuss sperm transport in the female tract including: **AII-26.B.1.a** Sperm capacitation **AII-26.B.1.b** Sperm thermotaxis & chemotaxis **AII-26.B.2** Describe sperm-egg interaction including:

	AII-26.B.2.a Sperm binding to zona pellucida (ZP) **AII-26.B.2.b** Acrosomal exocytosis (AE) **AII-26.B.2.c** Sperm penetration through the ZP **AII-26.B.2.d** Sperm fusion to the oolemma **AII-26.B.2.e** In vitro assays to evaluate sperm-egg interaction
AII-26.C	***Explain Molecular mechanisms of implantation*** **AII-26.C.1** Discuss the role chemokines in implantation **AII-26.C.2** Explain the role of DNA microarray in gene expression of Endometrium
AII-26.D	***Discuss Reproductive messengers*** **AII-26.D.1** Classify of reproductive hormones including: **AII-26.D.1.a** Lipid hormones **AII-26.D.1 b** Protein hormones **AII-26.D.1 c** Monoamines **AII-26.D.2** Enumerate different mechanisms of action of reproductive hormones
AII-26.E	***Discuss Evaluation of sperm function*** **AII-26.E.1** Discuss tests that evaluate the sperm motility **AII-261.E.1.a** Discuss Viability assays (Dye exclusion asssays & Hypo-osmotic sperm swelling assay) **AII-26.E.1.b** Discuss Electron microscopy **AII-26.E.2** Explain the postcoital test (PCT) **AII-26.E.3** Discuss the acrosome reaction (AR) test **AII-26.E.4** Explain Sperm penetration assay (SPA) **AII-26.E.5** Discuss the significance of hemizona assay

	AII-26.E.6 Explain the importance of semen ROS, the significance of its high level & how to assess **AII-26.E.7** Discuss Sperm DNA damage **AII-261.E.7 a** Enumerate the causes of DNA damage (1ry testicular & extra-testicular factors) **AII-26.E.7 b** Discuss the influence of sperm DNA damage on reproductive outcomes **AII-26.E.7 c** Explain the clinical value of sperm DNA damage tests **AII-26.E.8** Discuss Sperm chromosomal abnormalities **AII-26.E.8 a** Discuss the sperm chromosomal abnormalities (structural & numerical abnormalities) **AII-26.E.8 b** Explain the role of FISH in the assessment of sperm chromosomal abnormalities
AII-26.F	***Discuss The assessment of oocyte quality*** **AII-26.F.1** Explain the correlation ( ) the biochemical features of the follicular fluid (FF) & the oocyte quality **AII-26.F.2** Discuss the physicochemical features of FF **AII-26.F.3** Explain the role of metablomic techniques in the assessment of oocyte quality

B- Intellectual skills

B1	Formulate a systematic approach for laboratory diagnosis of metabolic and genetic diseases
B2	Make oral presentation and open discussions about scientific issues in a professional way.

D- Communication & Transferable skills

D1	Demonstrate key skills in the retrieval, preparation, analysis and interpretation of information from different sources.
D2	Make effective use of information technology e.g. web and internet. Database work
D3	Demonstrate self-direction and some originality in tackling and solving problems
D4	Work effectively both individually and in team and making appropriate use of the capacities of group members
D5	Communicate effectively, using the appropriate method with audiences of different levels of knowledge or experience.

(3) Course content:

Subjects	**No. of Teaching Hou**
	Lectures
1- A molecular view of ovulation	**5**
2-An overview of the molecular mechanisms involved in human fertilization	**6**
3- Molecular mechanisms of implantation	**7**
4- Reproductive messengers	**4**
5- Evaluation of sperm function	**4**
6- The assessment of oocyte quality	**4**
Total Teaching hours	**30**

(4) Teaching methods:

4.1: Lecture
4.2: Tutorial
4.3: Seminars

(5) Assessment methods:

5.1:Written Examination for assessment of ILOs number **AII-26**.

5.2 seminars: the candidate should prepare and present at least one seminar in atopic related to the course and determined by the supervisors in front of the department staff (without marks).

Assessment schedule:

Assessment 1: after 36 month from MD registration (written, exam with marks)

Assessment 2 : MCQ exams at the end of each semester (3 semesters)

Assessment 3: the candidate should prepare and present at least one seminar in atopic related to the course and determined by the supervisors in front of the department staff (without marks).

Percentage of each Assessment to the total mark:

Written exam: 70%

MCQ exam: 30%

Other assessment without marks:, seminars and log book assessment are requirement of the 2nd part exam.

Written exam	MCQ	total
48	12	60

(5) References of the course:

6.1: Text books:

- Infertility in the male: 4th edition by Lipshultz LI, Howards SS & Niederberger CS, Cambridge University Press, 2009.
- Essential Reproduction, 6th edition by Johnson MH & EverittBJ, Australia, 2007
- Infertility and assisted reproduction,1st edition by Rizk BR, Garcia-velasco JA, Sallam HN & Makrigiannakis A, Cambridge University Press,2008.
- Reproductive Endocrionology & Infertility,1st edition by Carrell DT, Peterson CM & Dixon JA, New York,2010.

6.2: Websites:

- http://www.medlib.iupui.edu/ref/biochem.htm
- The Biology Project (from the University of Arizona): http://www.biology.arizona.edu/default.html
- Harvard Department of Molecular & Cellular Biology Links: http://mcb.harvard.edu/BioLinks.html

6.3: Recommended readings

Revelli A, Piane LD, Casano S. Molinari E, Massobrio M & Rinaudo P (2009):

Follicular fluid content and oocyte quality: from single biochemical markers to metabolomics.

(6) Facilities and resources mandatory for course completion:

- Lecture rooms: available in the department

Course coordinator: Stuff members of credit committee of the department.
Head of the department: Prof. / Ayman El-Baz
Date: 29/4/2018